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ABSTRACT

A description is provided of the Lower Merrimack Valley Workplace Education Project (WEP), an educational project that offers English-as-a-Second-Language (ESL) and job-specific education classes to hourly employees in the Semiconductor Division of Alpha Industries. The challenge of the project was to create a WEP that could accommodate the various abilities, educational levels, and learning styles that were inherent in the ethnically diverse employee population at Alpha Industries. Each step of the project's development is discussed including goal development, program difficulties, enrollment procedures, project management, and curriculum development. The progress that was made on each of the assigned goals is also presented. Appended materials include such items as the English language curriculum for the workplace, an ESL student survey, a WEP Quarterly Review sheet, a student evaluation form, various information pieces describing Alpha Industries, and sample instructional materials. (GLR)

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LOWER MERRIMACK VALLEY WORKPLACE EDUCATION PROJECT

A Partnership Between Community Action, Inc. of Haverhill, MA

and Alpha Industries, Inc. of Woburn, MA

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FINAL REPORT

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PROJECT OVERVIEW

The Lower Merrimack Valley Workplace Education Program (WEP) grew from a partnership formed by two Massachusetts organizations. Community Action, Inc. (CAI) of Haverhill, a private non-profit CBO, teamed with Alpha Industries, Inc. of Woburn, a producer of semiconductors and electronic devices, to offer English as a Second Language (ESL) and job specific education classes to Alpha's Semiconductor Division hourly employees. Alpha committed on-site instructional space, 100% company paid employee class time, and the assistance of several Human Resources Department representatives to the project. CAI provided program oversight, a Project Director, instructional and counseling staff, and project materials. The WEP would operate 2 instructional cycles between January 1989 and December 1989. Alpha departmental supervisors initially identified 40 employees as potential participants for the English language classes.

The work force at Alpha's Semiconductor Division is over 400 individuals strong, 25% of whom do not speak English as their primary language. The composition of the group is ethnically diverse, containing a mixture of native-born Southeast Asians, Indians, Greeks, Hispanics, Latin Americans, and Portuguese which is the ethnic majority. The challenge for both Alpha and CAI was to create a WEP that could accommodate the various abilities, educational levels and learning styles that are inherent in such a melting pot.

CAI's Project Director met with key management and supervisory staff, during the months between 12/88 and 2/89, to outline project objectives, outreach strategies, participant and instructor selection, grantor expectations, and the importance of supervisory staff input into the project design, the employee goals and the Alpha specific curriculum. WEP information and sign-up sheets were distributed with employee paychecks during January and February, 1989. A project instructor was hired after a difficult 3 month search and began employee intakes and assessments at the close of March. The B.E.S.T. (Basic English Skills Test) was used as the pre-training language skills indicator.

Sixty three employees were tested for admittance to the first project cycle, April to August. Fifty-seven of these were actually enrolled. Five separate class groupings (Levels) were established based on the B.E.S.T. results. Prior to program orientation and the start of classes a meeting was held with management and employee supervisors to hammer out the most workable schedules for the new students, their departments and for the instructor, who was only contracted for 28 hours of class time weekly. Despite the fact that supervisors would be losing 4 hours of weekly production time from their program participants, all were all very supportive and accommodating, and with minimum difficulty, they came up with a class schedule that was most convenient for the employees and instructor.

Levels 1 - 3 met 4 days/week, for 1 hour/day. Two more advanced levels, 4 and 5, met once per week each for 1 hour. These two particular classes were designed to involve the students, some of whom were department group leaders and production line translators, in the development of the lower leveled employees. The one hour workshops encompassed group discussion of social and Alpha related issues, job related grammar and vocabulary building exercises, problem solving, and extensive written homework which required keeping a weekly journal and submitting it to the instructor for critique.

The three lower leveled classes began working on a specialized curriculum focusing on reading, writing, and oral English language skills. These skills were introduced and learned in the context of three progressively specific subject areas: standard English grammar, vocabulary and conversation; job specific English for the workplace; job specific English for the Alpha workplace. Texts were not regularly used. Non-academic lessons integrated familiar daily, social, and Alpha workplace language into guided conversations, strip stories, disappearing dialogues, jazz chants, stories and vocabulary exercises. Homework was an important part of learned skill reinforcement. Daily lesson plans built on previously taught material. Weekly teacher-made assessments were used to monitor student progress. Basic curriculum is Attachment A.

Supplementary to the curriculum the instructor included lessons and discussions on the history of state holidays celebrated during the course of the project. Students learned and were tested on this material. Discussions and workshops on understanding benefits, plant lay-off notices (of which there were two while the WEP was operating), and American culture were incorporated into the basic curriculum.

Throughout the first cycle the instructor collected workplace specific materials by spending the bulk of her non-teaching time on the production floor. There she observed process, procedures, the speech patterns of American employees and took note of the most commonly used slang and idioms. Meetings scheduled with department supervisors assisted her in identifying each employees' workplace language skills objectives. (See form, Attachment B). From these meetings the instructor began to develop the Alpha specific curriculum that would be introduced to classes at the start of Cycle 2 in August 1989.

Approximately one month prior to the start of the second cycle the project director and instructor designed a Student Survey and a Supervisor's Quarterly Review. These instruments were used to provide feedback and data on program effectiveness. The student survey gathered information on the student's view of the English class and on his/her own progress. The quarterly review sought supervisors' impressions of program and employee progress based on the first 12 weeks of instruction. A Cycle 1 Student Evaluation was also developed. It included the teacher's and supervisor's perceptions of student performance. One was completed for each student and was discussed in a meeting with the instructor at the close of Cycle 1. Examples of each and results from the Student Survey are included as Attachments C through F .

Outreach and intake activities were also geared up at this time to attract new program participants for Cycle 2. Memos were distributed in three languages: English, Spanish and Portuguese. Supervisors were asked to identify potential students. Interested employees who had previously been assessed but not enrolled during Cycle 1, were contacted to determine their interest. Potential students completed an intake form and were individually assessed for skills levels by the instructor. Meetings were then held with management and supervisors to: 1) discuss Cycle 1 students, their progress and the outlook for their remaining in classes; 2) review the B.E.S.T. scores of the newly assessed employees; and 3) determine the number of classes and new schedules. Once again, Alpha management and supervisory staff were extremely supportive. They actively lobbied for the enrollment of individuals who scored very low on the assessment, despite the realization that these individuals would make little progress given the time left before the program completion. It was agreed that the WEP would continue with the same number of classes but with the levels being grouped as Level 1A and Level 1B, etc., so as to not discourage those who had not progressed enough to advance a level. In other words, Levels 4 and 5 became Level 5A and 5B, 2 and 3 became 3A and 3B, and Level 1 became 1B and a new grouping of the extremely low leveled students was named 1A. Of the original 57 enrollments, 40 employees were still actively participating in the WEP. All continued on to Cycle 2. Seventeen additional employees were assessed. Thirteen were actually enrolled. See Participant Profile, Attachment G.

Cycle 2 started after a three week delay. Several weeks of skills review was given to each level to accommodate for the down time and the new students. The new Alpha specific curriculum, What We Do At Alpha (WWDAA) was then introduced, in varying degree, to all levels except Level 1A, a class of 5 students with two pre-literates and one deaf individual. Curriculum outline is found in Attachment H.

The WWDAA curriculum consists of two sections and focuses on Alpha's three major production areas: Semiconductor; Junction and Schottky; "Glass". It is important to note here that Alpha's focus for this curriculum and WEP was not to provide language classes that would teach specific production line skills and individual job tasks. Alpha saw that employees could not transfer easily into lateral positions, job upgrades, or into positions as group leaders due to their inability to communicate rather than their not adequately performing job tasks. Alpha's most critical need was to assist their employees in developing better communicative skills. Once this was mastered a curriculum could then be designed to address the teaching of more technical skills.

With this in mind, broad yet specific goals were set for the program and individuals. Alpha did not test percentages of error rates, specific quality improvement, etc. They did test the percentage of English spoken on the production line and awareness of safety and emergency procedures among those enrolled in the WEP. Alpha supervisors noted a 35% improvement rate in the amount of English spoken regularly on the production floor (from 40% to 75%). This improvement not only reflects success in the classroom, it attests to the commitment of Alpha's supervisory staff. At the outset of WEP the supervisors agreed that as the project progressed they would increasingly require English as the language spoken on "the floor" for those employees enrolled in the program.

This goal was also reinforced during the weekly workshops held with Levels 4 and 5. The employees in these classes addressed the importance of the "English spoken on the floor" objective and were asked to assist the supervisors and group leaders in enforcing this rule. By the start of Cycle 2, all departments with WEP participants required instructions, questions, "chatter" with co-workers, and issues brought to supervisors to be spoken in English.

Safety issues were included in the curriculum throughout the WEP. Although chemical spills and "accidents" did not occur with great frequency, Alpha was concerned about the timeliness of reporting and correctness of procedures when they did occur. Workshops were given in conjunction with Alpha's Safety Officer several times over the 12 month project. Lessons on safety precautions and emergency procedures were taught and mastery tested. Safety terminology and specific vocabulary were included as learning objectives for every participant. By program close 80% of those who had completed the project knew the safety procedures and vocabulary associated with their department. The number of "accidents" and "spills" that were not reported appropriately (i.e. on time, to the department supervisor, etc.) was reduced by approximately 20%.

For all of the students, the work with the Alpha specific curriculum brought perspective to their Cycle 1 learning experiences. Many who showed only marginal signs of improvement by the close of the first cycle showed increased interest and achieved rapid mastery of new materials and concepts during Cycle 2. Now the students were able to apply what they had learned to what they did at Alpha Industries , how it related to Alpha's products and how it affected the company's success and/or failure.

Level 5B applied their increased comprehension and critical thinking skills by identifying that a department had been leaving out one particular step in the production process, as they had learned it in the WWDAA, and bringing the issue to the department supervisor. This generated a dialogue between the supervisor and the production group to isolate the problem. The problem was then brought to engineering as a glitch in the process that should be looked into.

Examples of classroom materials and a Sample Lesson Plan are included as Attachments I to N.

By the end of November 1989, the four higher class levels were completing Part 1 of WWDAA. Level 1B had mastered production vocabulary, were improving their conversational skills and their ability to ask questions about the production process. The teaching of WWDAA Part 2 began in January 1990 after a three month no-cost extension allowed the WEP to use unexpended funds.

The goal of completing the entire <u>What We Do At Alpha</u> curriculum was not achieved by the close of the project in March 1990. A significant lay-off occurred in February and although only three of the remaining WEP participants were directly affected, the project was forced to reduce its class time significantly in order to allow affected departments to cover production with WEP employees.

The B.E.S.T. was administered to all but 4 of those who were still enrolled in the WEP through the end of December; a total of 44 students. All supervisors involved in the WEP completed the Language Objectives checklist. The instructor completed final evaluations and submitted a final report. Each student completed a Workplace Class Evaluation (Attachment O).

Several meetings and presentations were held with Alpha management to discuss the possibility of Alpha's continuing the project and to highlight project accomplishments. Following the project's completion a petition was initiated by students and several department supervisors. The petition asked Alpha management to continue the project without Federal funds. Seventy signatures were obtained. Despite the positive outcomes, feedback and effect on morale, Alpha is not able at this time to commit funds and time off to the project. A serious effort was made to convince corporate management that the project should continue. Management agreed but could not free the resources necessary at this time. CAI is continuing to seek targets of opportunity for Alpha WEP funding.

PROJECT EFFECTIVENESS IN ACHIEVING ITS OBJECTIVES

The Alpha/CAI Workplace Education Program had four primary goals:

** Increase employer and employee awareness of the potential of WEP throughout the Lower Merrimack Valley;

** Through partnership with Alpha Industries, increase employer awareness of the definition and extent of "functional illiteracy" among the general workforce and its effects on productivity, quality, safety and attendance;

** Demonstrate to employees the potential long-term benefits of a workplace education program: the possibilities for career advances, job retention, enhancement of self image and self esteem, increased productivity;

** Develop a WEP model that can be replicated. The model will be a true working partnership, incorporating public and private resources and the positive energies and aspirations of local employers.

In addressing the objectives of Goal 1, CAI disseminated information about the DOE funded WEP in its "Community News" bimonthly publication and in the local Haverhill newspaper. The article included critical information about illiteracy as a national crisis and related statistics to further illustrate the point. Alpha followed CAI's lead and published a description of the program in its bimonthly publication "Alpha Bits".

CAI also purchased a brochure titled "Functional Illiteracy Hurts Business", published by the Business Council for Effective Literacy, and distributed it to over 50 businesses in the Lower Merrimack Valley area.

The WEP Project Director met with four local businesses interested in developing their own on-site educational program. One of these businesses has purchased the services of CAI to set up their project. Another has partnered with CAI and Alpha to submit an application for a federally funded WEP. CAI is currently seeking funding to assist a third in starting a project.

Alpha Industries was very aware of the extent of "functional illiteracy", described in Goal 2, as it pertained to the limited English speakers in its workforce. Through WEP, CAI helped Alpha to realize that the skills taught in WEP must be reinforced constantly and must be taught over a continuum of time, not merely in a 9 month program. Concern for safety, quality and productivity will only remain constant if the skills taught in class are utilized by the entire workforce and not just those who participated in WEP. Because of its experience with WEP and exposure to its benefits, Alpha recognizes the need for employee training at all levels including the hourly and salaried workers.

CAI and Alpha met Goal 3 primarily through the provision of on-site instruction. This, in turn, empowered Alpha employees to make changes happen in a number of areas. The first area to benefit was employee self image and esteem. 90% of the students responding to a survey question (6/28/89 1st quarter student survey) on English speaking skills and comprehension noted improvement. 68% of those believed the course helped them in their everyday life. Supervisors noted that this positive attitude was evident on the production floor, i.e. in the way an employee was performing his/her job, improvement in peer interaction, desire to know more about individual job responsibility.

From enhanced self esteem came increased willingness to try to speak and use the English language on the job. This improved productivity and quality as less time was needed for translation and individual interpreters on the production line, and fewer mistakes were made due to employees being able to ask questions before commencing with an unfamiliar task.

Over 40% of the WEP students were recommended for job upgrades and or position changes during the course of the project. When Alpha conducted 2 lay-offs, in excess of 60 employees, due to a slow down in the industry and a reorganization, only 3 WEP students were affected.

CAI planned to utilize the services of a bilingual vocational counselor as one means toward achieving Goal 3. The individual identified for this position was an experienced counselor who worked full time in the Employment and Training Unit at CAI. At program outset the counselor was helpful in translating materials and compiling support services information. As the program progressed, his services were used less frequently for two

reasons. Primarily, Alpha and the project instructor did not feel that biweekly counseling was necessary and not particularly the best use of student time. Since the project start was delayed 3 months due to a lengthy instructor search, all agreed that unless it became necessary, the students would be best served by using the 2 hours of scheduled counseling every other week for classroom instruction.

The other reason for not utilizing the counselor as planned was that his full time counseling at CAI kept him from devoting the time necessary and from leaving his schedule flexible enough to be utilized effectively at Alpha. The counseling position was not charged to the project after the first 6 months. That money was then used to increase the instructor's weekly hours from 28 to 32.

Goal 4 has been achieved as evidenced in the businesses that sought CAI to discuss the possibilities of a WEP and to assist in setting up a project at their site.

The focus of CAI's Workplace Education Programs is to allow and encourage businesses to design a project that fits their immediate and long term needs. This is done with the technical assistance of the CAI WEP Project Director and Instructor. CAI has developed a fact sheet and checklist to assist businesses in strategizing a workforce education plan through the use of a quick needs assessment. CAI then provides project development information, i.e. how-to guides, historical data on past CAI projects, and examples of other WEPs locally and across the nation, to all of the individuals who will be involved in the set up and maintenance of the program.

The least replicable part of CAI's WEP model is that of the company commitment. This differs immensely from company to company according to size, resources, and attitudes of department supervisors. The key to a successful project, outside of the instructor's skills, is the ability of the supervisors, whose employees will be enrolled in a WEP, to "buy into" the importance of an on-site project and their role in its development.

The support at all levels of Alpha management was extraordinary. Nevertheless it was at times very difficult to meet with the participants' supervisors. Their belief in the benefits of the project was strong. Their schedules did not allow for the type of weekly, or monthly, contact with CAI project staff as preferred. Alpha's Human Resources Department liaison was extremely helpful and made more than sufficient time available to the project instructor and director. She scheduled the quarterly advisory meetings held at Alpha and attempted to get all involved supervisors to attend. As the project progressed it became easier to get supervisors to progress meetings. This attests to their taking the project more seriously as they began to see the progress of their enrolled employees. Supervisors also began to allow sufficient time to attend meetings which was not the case initially. After the first 6 months of the WEP progress meeting were well attended and contained a great exchange of ideas and suggestions on how the project and employees could best succeed.

The only true difficulty in the project was in the involvement of the Private Industry Council. This does not detract from the PIC support of the endeavor. The problem lay in the amount of time that the PIC Director could devote to WEP oversight and to designing and completing the third-party evaluation. At the 8 month mark of the project the PIC Director left for another position. This left the responsibilities of that person in the hands of several PIC/SDA staff. This was difficult to coordinate from the stand point of CAI staff and in the long run lengthened the amount of time it took to complete every item related to PIC oversight/involvement.

APPENDIX A

ENGLISH LANGUAGE CURRICULUM FOR THE WORKPLACE

Lesson plans will be based on the textual sources referenced in the accompanying bibliography of textual sources and will be ordered according to the group needs. The instructional method will be highly interactive and participatory; there will be work in small groups as well as individualization.

Unit Three, Learning English for Work at Alpha Industries will be developed with the assistance of the supervisory and management staff.

Unit One: Learning Standard English

1. "Who Are You?"; personal vocabulary; personal pronouns, the verb "be"; contractions; the verb "have"; possessive pronouns; asking questions; what and where; prepositions; introductions and greetings; filling out personal information cards and applications; section review

2. "Who's Calling?"; telephoning vocabulary; review of the verb "be"; isn't and aren't; there is and there are; is there and are there; who; that, that is , that's,; can, can not, can't; prepositions to, for, with; numbers; requests and invitations; section review

3. "How Do I Get There?" vocabulary and directions; traffic signs; abbreviations; numbers; how and where; singular and plural; it and it's; do does, don't and doesn't; asking, giving, and following directions; prepositions next to, across from, between; north, south, east and west; right and left; section review

4. "Is It Time For Work?" vocabulary of work and time; progressive verbs; I will and I'll; telling time; the calendar; prepositions at and on; asking questions about time; reading schedules; how much and how many; reading job ads; a & an; calling about a job; filling out a job application; section review

5. "Going To Work" vocabulary of the workplace; past tense of "be"; wasn't and weren't; past tense of regular verbs; past tense of irregular verbs; asking questions about the past; review of time; can you, could you, would you; and & but; alphabetical order; review of job titles and descriptions; want ads for work; section review

Unit Two: Learning English of the Workplace

1. Personal Data: vocabulary of personal data; filling in applications; answering questions about personal data; numbers; dates; places; personal pronouns; section review

Unit Two - cont.

2. Skills and Interests: vocabulary of skills and interests; answering questions about skills and interests; verbs related to skills; can and do; writing short sentences about skills and interests; using compound verbs; filling in simple charts; practice interviews; reading comprehension; section review

3. Occupations and Duties: vocabulary of occupations and duties; conversational skills related to occupations and duties; I'd, I'll, that's; reading job announcements; reading comprehension; section review

4. Maps and Directories: numbers; vocabulary of direction; conversation of directions; reading maps, charts, and directories; section review

5. Time and Money: vocabulary of time and money; conversational skills related to time and money; making appointments; filling in timesheets; understanding shirts; pay per hour; overtime and time and a half; shift differential; section review

6. Personnel Department - Asking Questions: vocabulary of employee manual; conversational skills relating to employee orientation; understanding duties; schedules, salary, requirements, fringe benefits, starting date; probationary period, temporary status; sick days, vacation days, holidays; section review

7. Work Experience: vocabulary of work history; conversational skills related to the work history; review of dates, job descriptions; composing work records; explaining skills related to use of equipment; reasons for separation from previous employer; section review

8. Schedules and Transportation: vocabulary of schedules and transportation; conversational skills related to schedules and transportation; reading train and bus schedules; time management; transportation costs; reading comprehension; section review

9. Safety: vocabulary of safety and health factors; conversational skills related to safety and health factors; safety equipment; reading posters; types of injuries and accidents; appropriate clothing; safety procedures; Right To Know, chemicals and hazardous materials; supplies; reading comprehension; section review

10. Want Ads: vocabulary of want ads; abbreviations; conversational skills related to job search; reading skills related to job search; section review

Unit Three: Learning English for Work at Alpha Industries - curriculum being developed

APPENDIX B

OBJECTIVES FOR ON-SITE/JOB SPECIFIC ESL CLASSES AT ALPHA

Supervisors: Please check the objectives below that you feel are important for your employees to learn in the ESL language classes.

LANGUAGE FOR THE IMMEDIATE JOB SITUATION:

Worker will be able to: Date Ach'd

_____state clearly "yes" or "no" about understanding work - related oral instructions.

_____understand that in the USA you do not lose respect by admitting that you don't understand.

_____ask for instructions to be repeated.

_____understand and use the English names for tools, materials, and equipment in the workplace.

_____ask for clarification about job assignments.

_____follow a series of spoken directions.

_____understand oral feedback about the quality of work in relation to mistakes in assembly.

_____understand oral feedback about working too slowly or incomplete work.

_____express to an appropriate person an upcoming absence from work and the reason for it.

_____recognize safe and unsafe practices in relation to:
____special clothing ____smoking ____fire ____lifting
____chemical spills ____other_____

_____understand warning vocabulary and be able to warn someone quickly of danger.

_____remind a co-worker about a safety rule.

_____ _____

LANGUAGE FOR GREATER WORK FLEXIBILITY, UNUSUAL SITUATIONS, AND MORE RESPONSIBILITY:

Worker will be able to :

_____explain in English the steps in his/her job.

_____instruct clearly another person in the steps of a job.

_____volunteer information about a work problem, when appropriate.

_____ask for more complete instructions about a process.

_____receive, repeat, and deliver oral messages.

_____understand more complex sequences of instructions.

_____ _____

_____ _____

LANGUAGE FOR COMMUNICATION ABOUT PROCEDURES, RIGHTS, AND PROBLEMS

Worker will be able to:

_____know whom he/she should speak to about a problem.

_____understand that in the American workplace it is better to bring problems to the attention of someone than to ignore them.

_____approach a supervisor and arrange a time to talk about a problem.

_____state a problem and answer questions about it.

_____approach a supervisor about a possible change in job assignment.

_____know the procedure for job posting.

_____understand the concept of benefits and insurance and the importance of them.

_____ _____

_____ _____

LANGUAGE FOR OTHER DIMENSIONS OF WORK EXPERIENCE:

Worker will be able to understand and use basic job related vocabulary such as:

_____ spill team	_____ acid	_____ emergency
_____ danger	_____ voltage	_____ grounded
_____ high reliability	_____ breakdown	_____ bonding
_____ ribbon	_____ "specs"	_____ silicon
_____ package	_____ diode	_____ wafer
_____ cap	_____ mask	_____ UV light
_____ etch	_____ "bunny suit"	_____ measure
_____ "dummy"	_____ short	_____ raw
_____ static electricity		_____ visual inspection

_____ conductor	_____ insulator	_____ impurities
_____ beam lead	_____ chip	_____ die
_____ _____	_____ _____	_____ _____
_____ _____	_____ _____	_____ _____
_____ _____	_____ _____	_____ _____

_____

TO BE COMPLETED UPON STUDENT EXIT FROM PROGRAM:

_____ is sufficiently able to perform
Student Name the objectives indicated above.

Signed: _____
Supervisor

Signed: _____
Instuctor

PRELIMINARY RESULTS OF THE ALPHA ESL STUDENT SURVEY

Of the 31 students surveyed, 77% feel they are learning English, 52% feel the course is helping them with their work, and 68% find it is helping them in their everyday life. 68% find the course interesting.

Conversely, 6% feel they are not learning English and it does not help them with their work. 3% find it does not help them with their everyday life and think it is boring.

Of the sample surveyed, 39% meet for class once a week. Of that group, 17% would like to continue to attend class once a week, and 83% would like to have more classes (2-4 times/ week).

Of the sample, 61% attend class four times a week. 53% of that group would like to continue at four times/week and 32% would like more. 15% are undecided.

Regarding lessons and tests, 74% feel they are fair, 13% difficult, 0% too difficult, 19% easy, 0% too easy, and 3% are undecided. (Some students chose two answers to this question).

Regarding English speaking and comprehension skills, 6% surveyed feel no change and 90% note improvement. 3% are undecided.

Regarding reading and writing skills, 3% note no change, 93% improvement, and 3% are undecided.

Prepared by Pat Breen 6/28/89

ALPHA ESL STUDENT SURVEY

Please check the answers that apply for you.

1. I like my class because:

____ I am learning English

____ It helps me with my work

____ It is interesting

____ It helps me in my everyday life

____ Other _____

2. I don't like my class because:

____ I am not learning English

____ It doesn't help me with my work

____ It is boring

____ It doesn't help me with my everyday life

____ Other_____

3. Now I have ____ hour(s) of class per week

____ 1

____ 4

4. I would like ____ hours of class per week

____ The same

____ More

____ Fewer

5. The lessons and tests are:

____ fair

____ difficult

____ too difficult

____ easy

____ too easy

6. I feel my speaking and understanding now are _____ they were before.

____ the same as

____ better than

____ worse than

7. I feel that my reading and writing are _____ they were before.

____ the same as

____ better than

____ worse than

APPENIX E

WORKPLACE EDUCATION PROJECT - QUARTERLY REVIEW

Please Take a few minutes to answer the questions below. It is important that you be candid. This information will help us to improve and expand the project's effectiveness. It will also be included in our final evaluation of the program. Please return this form to Pam Sola by June 30. Your time is appreciated.

Cindy Zylkuski - Project Coord.

1. Did the intake and assessment of your employees proceed smoothly, with minimum disruption to production schedule? If not, please explain.

2. Has your communication with the project instructor been sufficient? Helpful? Minimal? Too often? Not frequent enough? Please explain.

3. How, if at all, have the classes affected your production?

4. How, if at all, have the classes affected your employees' morale, behavior, productivity, communication, etc.?

5. Do you, the supervisors and/or the group leaders reinforce the use of English on the job? How?

6. Please give us your impressions, suggestions, criticisms of the project now that 10 weeks of instruction have passed?

Name:_____ Group:_____
(optional)

# of Employees in Classes:_____

CAI/ALPHA STUDENT EVALUATION

Name:_____ Level:_____ Cycle_____

Areas For Evaluation	V. Good	Good	Fair	Needs Work	N/A
1. ATTENDANCE					
2. PUNCTUALITY					
3. TEAMWORK SKILLS (Cooperation)					
4. EFFORT					
5. INTEREST					
6. HOMEWORK					
7. CONFIDENCE CHANGE - IN CLASSROOM					
8. CONFIDENCE CHANGE - ON THE JOB					

Supervisors: Please Note! Check category #8, sign, and return to the Instructor. Thank You!!

SUPERVISOR'S COMMENTS:

INSTRUCTOR'S COMMENTS:

_____ Supervisor Signature

_____ Date

_____ Instructor Signature

_____ Date

APPENDIX G

LOWER MERRIMACK VALLEY WORKPLACE EDUCATION PROJECT

PARTICIPANT PROFILE

Total Participants Served: 70

Cycle 1: 57
Cycle 2: 13

Years of School Completed or Educational Functioning Level:

Level 1 (grades 0 - 8): 31
Level 2 (grades 9 - 12): 39

Ages:			
16 - 24	13	(19%)
25 - 44	44	(63%)
45 - 59	12	(17%)
60 - up	1	(1%)

# of Males: 12 (17%) # of Females: 58 (83%)

Ethnic Background:			
Asian or Pacific Islander -	20	(29%)
Black -	0	(0%)
Hispanic -	17	(24%)
White/not of Hispanic Origin -	33	(47%)

Time Employed at Alpha :

0 - 5	mos.	2	(3%)
6 - 11	mos.	10	(14%)
1 - 5	yrs.	38	(54%)
6 - 10	yrs.	12	(17%)
11 - 15	yrs.	5	(7%)
16 - 20	yrs.	3	(4%)

Number of Students Completing the WEP: 48 (69%)

Percent Improvement After 2 Cycles (Using B.E.S.T.):

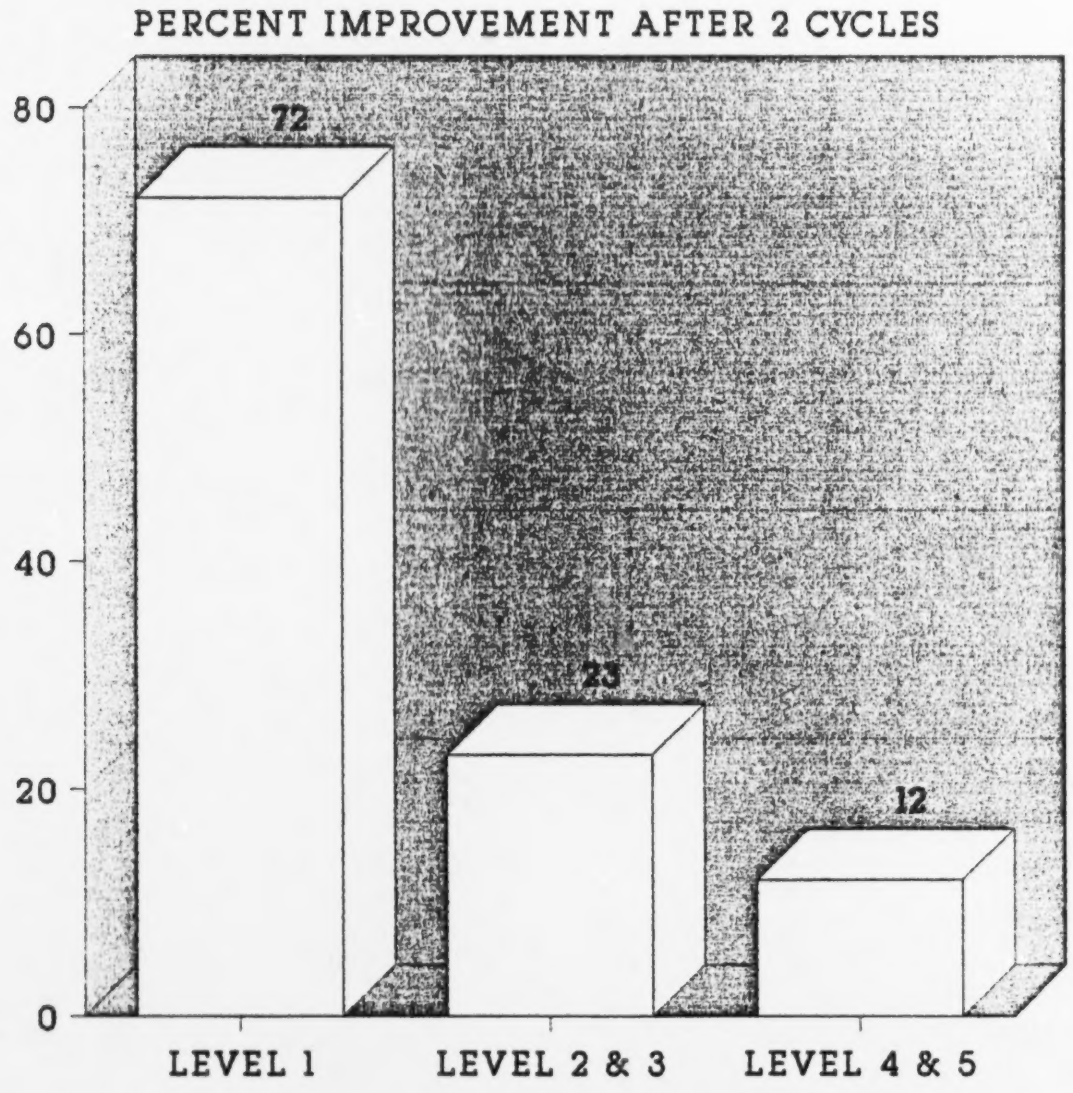
Level 1 - 72%
Level 2 and 3 - 23%
Level 4 and 5 - 12%

Overall Average Percent of Improvement: 36%

% of Participants Speaking English on Production Floor:

Project Start - 40%
Project Completion - 75%
Improvement Rate - 35%

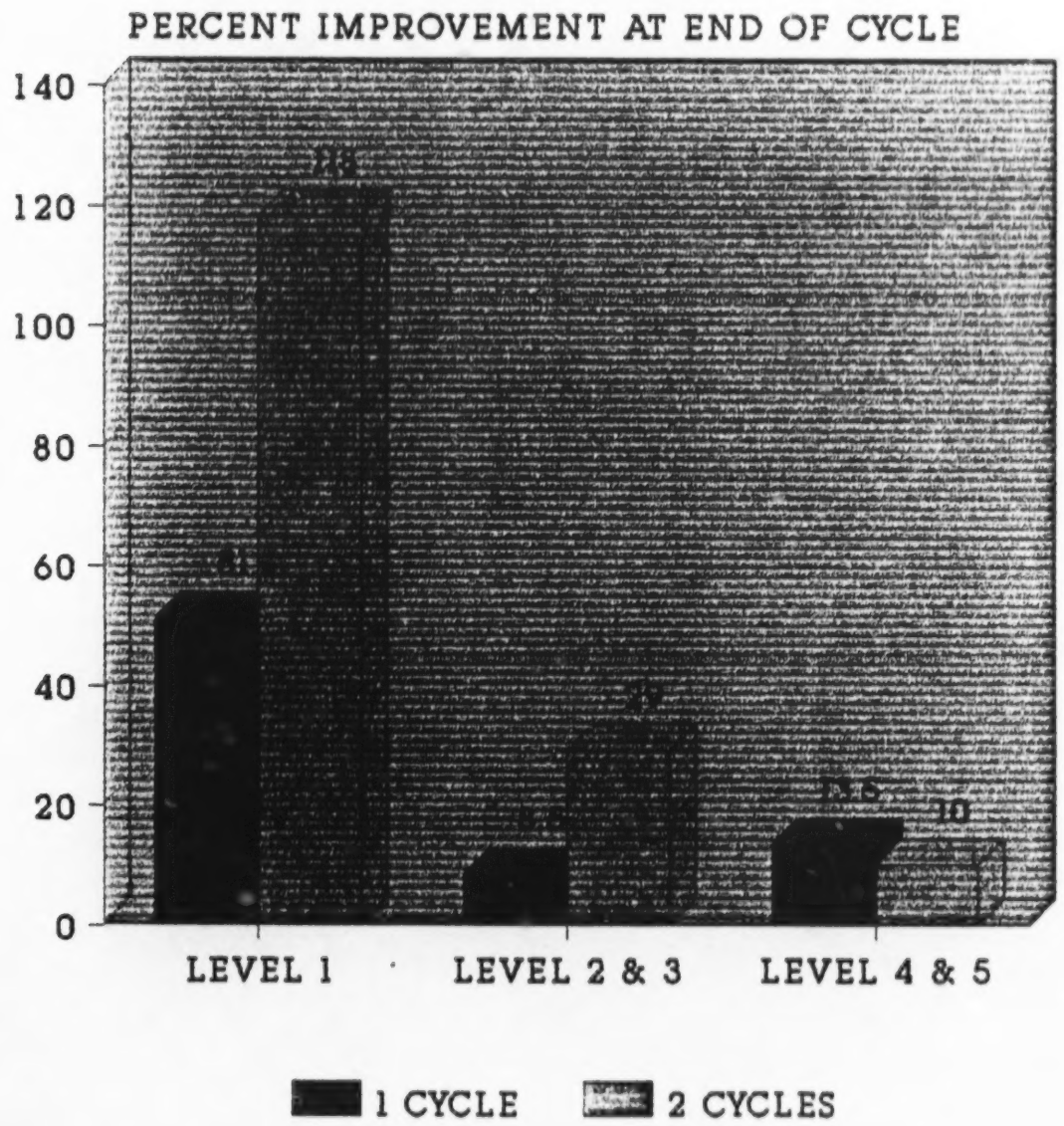
ESL ALPHA INDUSTRIES
ALL LEVELS



OVERALL IMPROVEMENT

3/1/90 PAT BREEN

ESL-ALPHA INDUSTRIES
ALL GROUPS BY CYCLE



3/1/90 P.BREEN

WHAT WE DO AT ALPHA PART 1 OUTLINE

I. Products with our parts
    A. Microwave relay equipment
        1. Commercial
        2. Military
II. Wafer
    A. Origin of Silicon
    B. How Silicon wafers are made
III. Semi-conductor
    A. Dice manufacture
        1. Epitaxial
        2. Diffusion
        3. Measurement
        4. Photoprocessing
            a. vacuum-baking
            b. resist-coating
            c. ultra-violet light
        5. Etch
            a. wet
            b. plasma
        6. Gold-plate
        7. Grind
        8. Metal deposition
        9. Test/step wafer probe
        10. Saw
        11. Dismount

WHAT WE DO AT ALPHA - PART 2

I. Junction and Schottky

- A. Explanation
- B. The Chip Line
  - 1. Probing
    - a. specs
    - b. test
    - c. vacuum pen
  - 2. Packaging
- C. The Beam Lead Line
  - 1. Probing
    - a. autoprobe
    - b. "O/S"
    - c. visualed
  - 2. Packaging
- D. Die Bonding
- E. Ribbon Bonding
- F. Encapsulation
- G. Testing
  - 1. Screened
  - 2. Unscreened

II. The Glass Line

- A. Explanation
- B. "Boat Loading"
  - 1. Preform
  - 2. "C" bend
- C. Sealing
- D. Diode Testing
  - 1. Manual
  - 2. Automatic
- E. Polarizing
- F. Solder-Plating
- G. Packaging

ALPHA 5B JOB RESPONSIBILITIES

Write two questions for each of the following statements.

1. I sign the time cards.

a.

b.

2. I check the wrist straps.

a.

b.

3. I look at the dispatch list to give the work on Wednesdays.

a.

b.

4. My group leader trained me in the beginning.

a.

b.

5. I would like to learn about testing.

a.

b.

6. I have learned ribbon bonding, chip bonding, U.V.(?) testing and much more.

a.

b.

7. Visual inspection requires a lot of attention.

a.

b.

8. Reviews are always late.

a.

b.

9. Group leaders, not supervisors, sign the time cards.

a.

b.

10. I cap high reliability jobs.

a.

b.

11. I do etching.

a.

b.

12. I like die bonding.

a.

b.

13. I attend a meeting with supervisors, engineers, group leaders, and planners every day at 8:00.

a.

b.

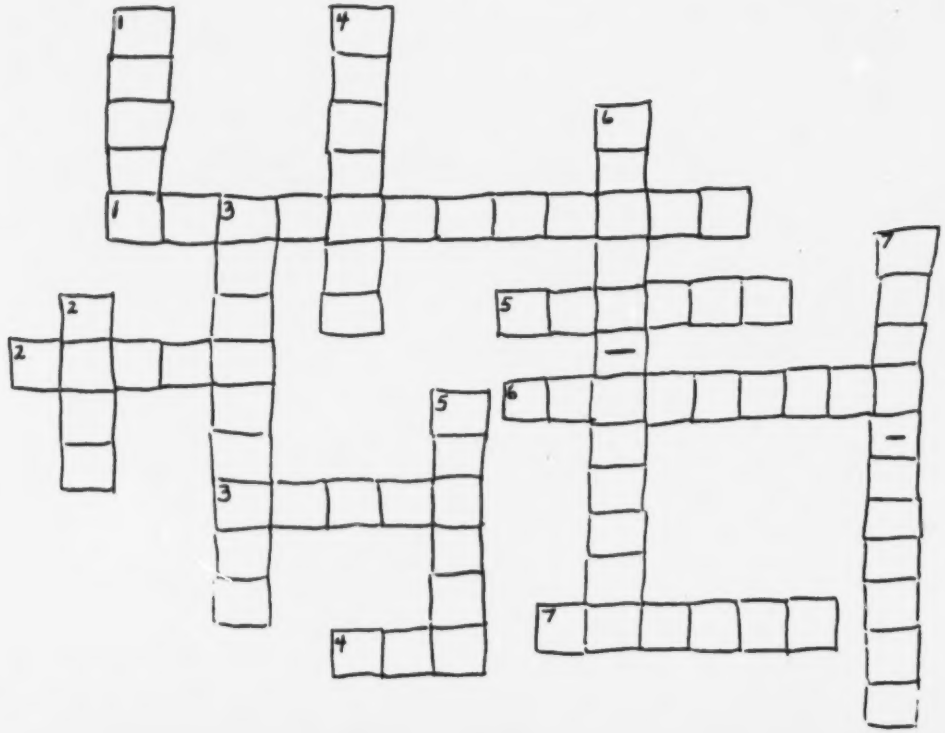
ALPHA WAFER CROSSWORD PUZZLE

ACROSS

1. not a conductor and not an insulator
2. Alpha's chips go into _____ guns and detectors.
3. The wafer is cleaned with _____.
4. Etching with acids is called _____etch.
5. Etching with gases is called_____.
6. and 7. A pattern must be (6) _____ on the wafer before it is _____.

DOWN

1. dice
2. UV light is shined through a _____ to make a pattern on the wafer.
3. Alpha's chips are in _____relay equipment.
4. We start with a raw _____wafer.
5. In Photo Processing, a drop of _____is put on the wafer.
6. _____light is used in Photo Processing.
7. The wafer is _____so the chip can be soldered to the package.



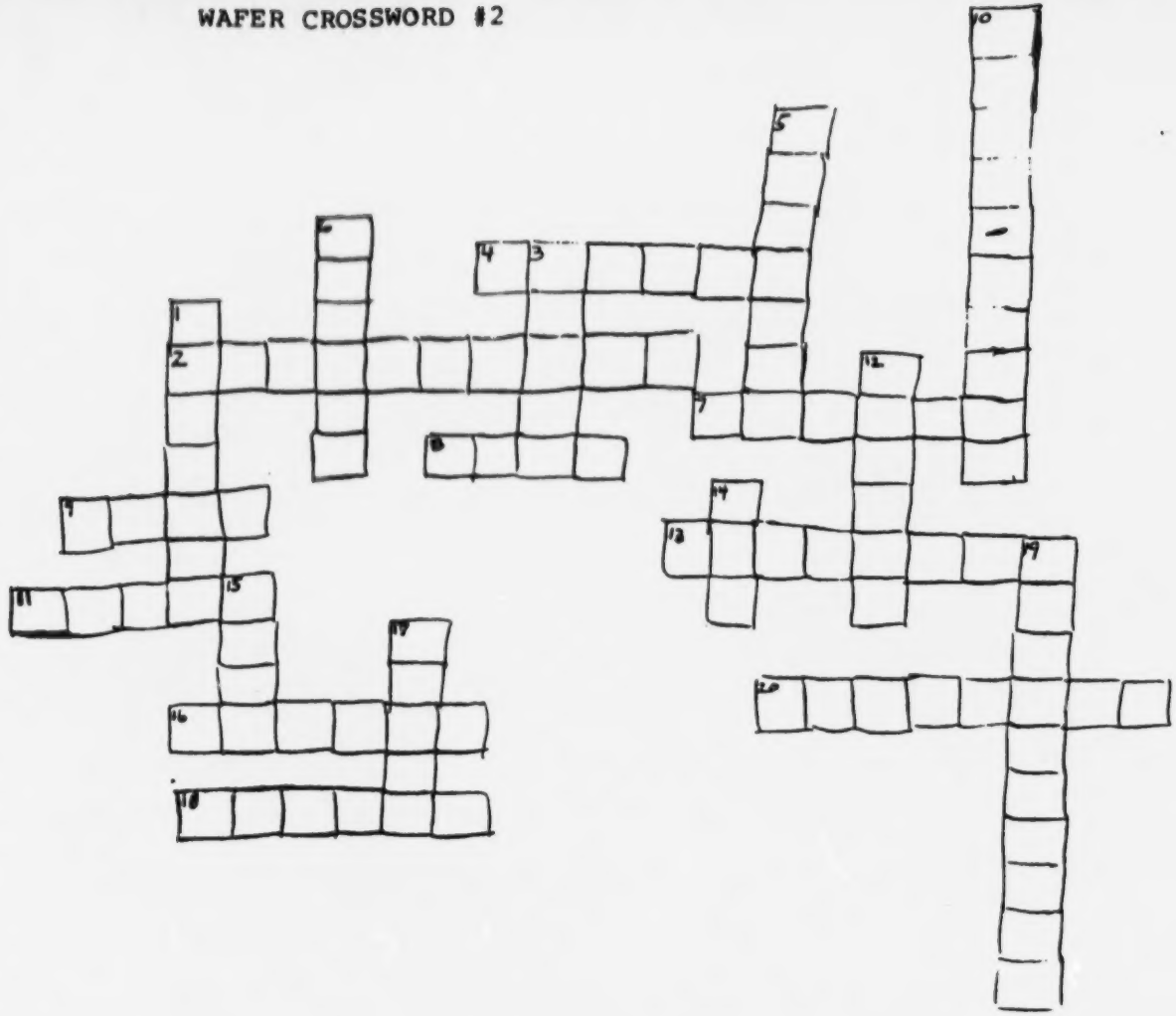
Label 3A & 3B

APPENDIX K

WAFER CROSSWORD CLUES

1. Start with a raw _____wafer.
2. Add _____to the wafer.
3. Clean the wafer with _____.
4. Place it in a furnace to add protective _____.
5. _____the layers.
6. _____-bake the wafer to dry.
7. Put a drop of _____in the middle of the wafer, then spin it on a "Spinner Coater".
8. Shine ultra-violet light through a _____onto the wafer to make a pattern on the wafer.
9. _____the pattern on the wafer with acids (wet) or gases (plasma).
10. _____the wafer and put a mesa (gold bump) on each chip.
11. _____away some of the wafer so it will be thin.
12. Add metals such as aluminum, platinum, and _____.
13. Test. Put a _____ink dot on the bad chips.
14. Bond the 3" wafer to a substrate with _____.
15. Saw the wafer into _____.
16. Put the substrate and chips into a _____of Trichlo. The dice fall off.
17. Drain, wash, and dry the chips. Then shake them through a _____
18. Put the chips on a vibrator. Pass a _____over the chips.
19. Place the good dice in _____called vials.
20. Send the good dice to Junction and _____.

WAFER CROSSWORD #2



Name _____ Date _____ APPENDIX L

I. Write the word that matches in the blank.

oxidizer	fire	acid
warning	dangerous	evitar

1. avoid _____
2. combustible _____
3. corrosive _____
4. perigoso _____
5. aviso _____
6. flammable _____

Level 1

II. Telephone numbers: write the Alpha extension.

Laura (facilities officer) _____

Spill team _____

III. Fill in the blank with the correct word.

poison	fumes	flammable liquid

1. Don't breathe the _____.
2. Don't drink the _____.
3. No smoking near the _____.

Tune of Frere Jacques

WHAT IS THIS CALLED?

Could you help me?
Could you help me?

Yes, I can.
Yes, I can.
Hold on just a minute.
Hold on just a minute.

OK, thanks.
OK, thanks.

* *

What is this called?
What is this called?

I don't know.
I don't know.
Let's ask our group leader.
Let's ask our group leader.
She might know.
Then we'll know.

Ms. Group Leader, Ms. Group Leader,
What's this called?
What's this called?

That is called a _____*.
That is called a _____.

A _____, thanks!
A _____, thanks!

*package, diode, wafer, beam lead, etc.

SAMPLE ESL LESSON PLAN FOR ALPHA INDUSTRIES, INC. WEP

TARGETED LEVELS

3A, 3B, 5A, 5B

OBJECTIVES

1. Students will be able to express a lack of understanding.
2. Students will be able to ask for clarification.
3. Students will identify and learn new, unfamiliar Alpha job tasks.
4. Students will gain Alpha-specific vocabulary: raw, Silicon conductor, insulator, resistant, conductive, reactor.

TIME

4 hours (1 week)

SUPPORT

"What We Do at Alpha, Part I" handout
"I Don't Understand", an Alpha Rap handout
Silicon wafers in various stages of development
"Concentration" game poster with "What We Do at Alpha" vocabulary

METHOD

1. Expressing a lack of understanding/Asking for clarification.
   a. Alpha-specific
      Students identify individual Alpha job tasks, i.e. ribbon bonding, capping, boat-loading. Teacher asks "Who knows these jobs?" and "What do they mean?", finally, asks "How do we tell someone we don't understand something on the job?" and "How do we ask for help?". Teacher introduces "I Don't Understand" Alpha Rap by writing one line on the board, students copy, repeat orally, erase, repeat. Continue line by line until memorized. Reinforce with disappearing dialogue handout.

2. "What We Do at Alpha - Part I" - the Silicon wafer
   Teacher holds up a raw 3" Silicon wafer on a substrate and asks "What is this?". Students identify wafer, Silicon, discuss the origin of Silicon (beach sand) and how a wafer is made.

3. "What We Do at Alpha - Part I"/Clarification
   Students read Step 1 - Epitaxial, identifying words and processes that they don't understand using the structure of "I Don't Understand" Alpha Rap.

4. Epitaxial: Reinforcement and Review
   Students play "Concentration" game with Epitaxial vocabulary

by matching and then defining the words. Students unable to define a word will employ "I Don't Understand" Alpha Rap by asking another student for definition or clarification.

HOMEWORK

Students will read "Diffusion" (step 2 of "What We Do at Alpha-Part I") and write 5 sentences identifying what they don't understand or would like clarified.

Alpha's chips are used in microwave relay equipment that enables us to make long distance phone calls. They are also used in radar guns and detectors ("fuzzbusters"), motion sensing devices that open supermarket and garage doors and set off alarms in security systems. Alpha also manufactures chips for U.S. missiles and satellites.

How do we make these chips?

Step 1 (EPITAXIAL)

We start with a raw 3" Silicon (Si) wafer. Silicon is a semi-conductor which means it is neither a conductor nor an insulator. In order to make silicon more conductive or resistant, a layer of Silicon is added to the wafer in a reactor at a very high temperature. In this way, impurities which are conductive or resistant are deliberately put on the wafer.

Step 2 (DIFFUSION)

Next, the wafer is cleaned of unwanted impurities with acids. It is placed in a high temperature furnace where heat and gases may combine to alter the resistivity of the wafer. The furnace is also used to add a layer of oxidation (which will accept some types of etching but not others) to the wafer. Finally, the furnace can also be used to add protective layers to the wafer. Because the furnace has so many uses, it is possible for a wafer to return to Diffusion several times before it is finally "sawed" into "chips".

Step 3 (MEASUREMENT)

Once protective layers are added, they must be measured for accuracy.

Step 4 (PHOTO PROCESSING)

Next, the wafer goes to Photo Processing, where it is possible for the wafer to return as many as 7 or 8 times.

I Don't Understand

I don't understand. Could you say that again?
I don't understand. Could you show me one more time?
I don't understand.

Well, why not?
Why not?

It's too hard.

No, it's not!
No, it's not!

I don't understand how to do this job.

I will show you how you can do this job.

Thank you very much-- you've been kind to me.

You're welcome! Anytime! Now, let's get to work.

WORK PLACE

CLASS EVALUATION

1. This class has helped me speak English at work:
   a. a lot b. some c. a little d. nothing

2. This class has helped me to understand English at work:
   a. a lot b. some c. a little d. nothing

3. This class has helped me to improve my job:
   a. a lot b. some c. a little d. nothing

4. This class was _____ for me.
   a. too easy b. too hard c. exactly right

5. I need to practice _____ more.
   a. conversation b. comprehension c. pronunciation

6. What I liked about the class was _____
   _____

7. What I did not like about the class was _____
   _____

8. Because of this class, now I can do these 3 things better:
   _____ _____ _____

** Adapted directly from the Arlington Virginia Education and Employment Program (REEP).